Teaching Generative Language

Workshop Workbook: NAC

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Generativity:

"Linguistic productivity" (Mallot, 2003):
How can we understand a sentence we've never heard before, or say a meaningful sentence we've never said or heard before?

Overview

- Early behavioral cusps for generativity:
  - Generalized operants
  - Flexibility
  - Recombinative generalization

- Teaching generative language: Derived Relational Responding
  - Relational Frame Theory
  - Assessing DRR
  - Teaching using existing DRR skills
  - Teaching DRR

Early Behavioral Cusps for Generativity

Generalized Operants:

- Imitation, echoics
- Identity matching
  - see same/different protocols, Resources p 19

Flexibility:

- New non-arbitrary relational responses, e.g. difference
  - see same/different protocols, Resources p 19
- Contextual control, e.g. multiply-controlled tacting
  - see protocol, Resources p 4
- Verbal modules
- NET

Recombinative Generalization

- see matrix tracking sheet, Resources p 6
- see reference list, Resources p 68

Teaching generative language: Derived Relational Responding

★ **Relational Responding**: based on the relation between stimuli, not the stimuli themselves
- *Nonarbitrary*: based on physical relations (e.g. identity matching)
- *Arbitrary*: based on social convention (e.g. names/words and objects)

★ **Derived**: untaught responses emerge on the basis of previously learned relations
- *Not taught or based on generalization/abstraction*

RFT Overview

Relational Responding

- Nonarbitrary vs arbitrarily applicable

Emergent Relations

- Mutual entailment: A→B, then B→A

- Combinatorial entailment: A→B, C→B, then A←→C

Transformation of Functions

- Acquired functions of stimuli within a relational network will transform for other stimuli in the network based on the specific relation

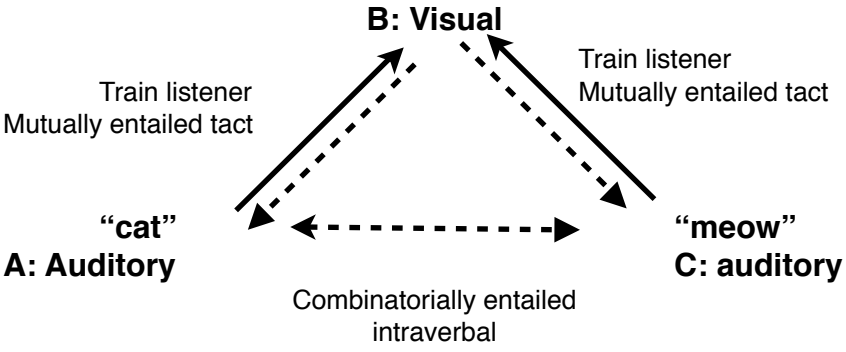
Assessing DRR

Research on the *Training and Assessment of Relational Precursors and Abilities (TARPA)*

- See TARPA outline for SAME, resources p 7
- For access to the TARPA, and the TARPA manual, email siri@siriming.com

- Measures of DRR correlate strongly with language and IQ
    - (also see: Cassidy, Roche & Hayes, 2011; Cassidy, Roche & O'Hora, 2010; O'Toole & Barnes-Homes, 2009; Pelaez, Barnes-Holmes, Rae, Robinson & Chaudhary, 2008)
- Adds support to the possibility that DRR is one of the foundational repertoires for language
- Highlights need for testing and training of auditory relations
- Suggests that the TARPA is an efficient means of assessing core DRR skills

Assessing DRR



Assessing DRR

See *Assessing Early DRR* protocols, Resources p. 8

Exercise
Use the assessment protocol for *Teach Listener/Derive Tact/Derive Intraverbal* for assessing coordination and practice with a partner:

Protocol: Teach listener response/derive tact (mutual entailment)

Introduction: explain that you have some pets and you are going to teach the student the names of your pets.

Step 1: Teach the listener response (A-B)
Step 2: Ensure tact is maintained without continuous reinforcement
Step 3: Test the tact response (B-A)

Protocol: Teach listener responses/derive intraverbals (combinatorial entailment)

Once the student has demonstrated mutual entailment with the name of a pet, go on to test combinatorial entailment as follows:

Step 4: Review the newly learned and previously known listener responses (A-B, C-B)
Step 5: Ensure the listener responses are maintained without continuous reinforcement
Step 6: Test the intraverbal response (A-C/C-A)

Stimulus Set :
A1 (name):
B1 (animal):
C1 (sound):

A2 (name):
B2 (animal):
C2 (sound):

Program: Assessing Early Derived Relational Responding

1. **Train Listener Responding/Derived Tact:**
   1.1. Train A→B Which one is called [A]?: *criteria=6 consecutive correct across exemplars*
   1.2. Test B→A What's his name [holding B]?: *criteria= 5/6 correct across exemplars*

Date	Train A1→B1								Train A2→B2								Test B1→A1:		Test B2→A2:	
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2. Combinatorial Entailment: **Derived Intraverbals**
   2.1. Review relations A→B Which one is called [A name]?, C→B Which one says [C]? *criteria=12 consecutive correct across exemplars (3 per exemplar)*
   2.2. Check mixed maintenance A→B, C→B without specific feedback: *criteria=8/8 consecutive correct across exemplars*
   2.3. Test A→C (What does [A] say?) and C→A (Who says [C]?): *criteria= 7/8 correct across exemplars*

Date	Review A1→B1				Review C1→B1				Review A2→B2				Review C2→B2							
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Date	Maint A1→B1				Maint C1→B1				Maint A2→B2				Maint C2→B2				Test AC1	Test AC2	Test CA1	Test CA2
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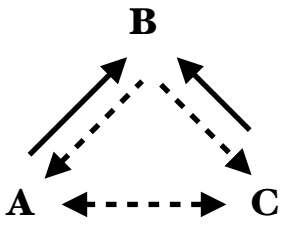
Teaching Using Existing DRR Skills



★ Use appropriate pattern of conditional discrimination training to efficiently teach novel relations between stimuli, and/or to use transfer of functions for novel responding

Examples

- Reading and spelling (e.g., Sidman, Cresson, & Willson-Morris, 1974; De Rose, de Souza, & Hanna,1996);
- Name-face matching (e.g., Cowley, Green, & Braunling-McMorrow, 1992);
- US geography (LeBlanc, Miguel, Cummings, Goldsmith & Carr, 2003);
- Money skills (McDonagh, McIlvane & Stoddard, 1984; Keintz, Miguel, Kao & Finn, 2011)
- Transitioning using activity schedules (Miguel, Yang, Finn & Ahearn, 2009);
- Communication skills including manual signs, picture exchange communication and vocal communication (e.g., Osborne & Gatch, 1989; Rehfeldt & Root, 2005; Halvey & Rehfeldt 2005; Rosales & Rehfeldt 2007)

Establishing Initial DRR: Frames of Coordination

★ Move from nonarbitrary relations to arbitrary relations

★ Use standard discrimination training procedures (basic elements of DTT), with a focus on:

- *Bidirectional* responding
- Responding as both speaker and listener

★ Multiple exemplar training, with a focus on:

- Testing for derived relations
- Focus on *flexibility* of responding

Establishing Other Frames

★ What all frames have in common is that they are generalized, contextually controlled patterns of relational responding.

★ Contextual Control—consistent relational cues:

- Focus on the specific *relation* to be targeted (same, name, goes with, part of, category, etc.)
- Establish the relational cue across stimulus sets

For all frames:

- Teach responding as speaker and listener
- Teach bidirectional relations between stimuli
- Focus on flexibility—the relation is key, not stimulus items, method of presentation, etc.
- Move between nonarbitrary and arbitrary relations
- Test for mutual entailment, combinatorial entailment, transformation of function
- Teach multiple examples of relations

Frames of Distinction

- see same/different protocols, Resources p 19, 39
    - Nonarbitrary
    - Nonarbitrary second order
    - Arbitrary conditional discriminations
    - Arbitrary derived relations

Frames of Comparison

- Bidirectional relations: if this is bigger, then that is smaller
- Flexibility: sometimes this is bigger, and sometimes this is smaller
- Move from nonarbitrary to arbitrary: nonphysical comparisons (e.g. value)
- Test for ME, CE, ToF

Frames of Opposition

- Nonarbitrary: physical relations under contextual control of "opposite" (contrast with "same")
- Arbitrary: no physical relation, e.g. intraverbal antonyms

Spatial Relations

Nonarbitrary spatial relations

- see nonarbitrary spatial relations protocol, Resources p 50

    - Bidirectional relations: object to base AND base to object
    - Flexibility: items in different relations, base/object reversals

Arbitrary spatial relations

Hierarchy

Class Inclusion*:* a nonarbitrary foundation for frames of hierarchy

- see class inclusion protocol, Resources p 55

Other Frames...

- **Deictic relations**: perspective taking (e.g., McHugh, Barnes-Holmes & Barnes-Holmes, 2004; Barnes-Holmes, McHugh & Barnes-Holmes, 2004)

- **Analogies**: relating relations (e.g., Persicke, Tarbox, Ranick & St. Clair, 2012)